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PERSPECTIVES

PERSPECTIVES '92

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American Productivity & Quality Center

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Introduction

There is quite an even division, as this is written, between those who see the U.S. coming out of a recession (albeit slowly)—advancing to bigger and better economic triumphs—and the "double dip" gang who sees more declines before a true recovery can take hold. Both camps see the U.S. acting in a more sympathetic world after the fall of the U.S.S.R. and Iraq, but both camps also see the inevitable umbrella effect of presidential politics. Nothing permanent and constructive happens in a presidential election year.

The illustrated outlook that follows is an attempt to deal with long-range and pervasive issues that will determine the U.S. position in six or 16 years, not in six months. It will first deal with the small amounts of direct information that exist on productivity and quality. It is productivity that will ultimately determine the competitiveness and thus the economic health of the U.S., and it is quality that will be the vehicle that organizations must use to reach necessary levels of productivity and customer satisfaction.

The remainder of the outlook concerns other economic parameters of importance to U.S. productivity and quality improvement, and then expands beyond the U.S. to present information on relative competitiveness of the leading industrial nations. In general, the outlook is rather discouraging in the absence of focused leadership from the U.S. Congress and business community.

U.S. Productivity and Quality Performance

Over the 40 years from 1950-90, U.S. labor productivity improvement averaged 1.7 percent/year and multifactor (or total) productivity averaged 1.0 percent (figure 1). But it is more meaningful to note that the improvement rates before 1973 (2.3 and 1.6, respectively) are so much better than the rates after 1973 (0.8 and 0.4). Regardless of how well other nations did in that period, such low improvement rates after a sustained period of much higher performance need investigation.

Figure 2 shows a different pattern for the manufacturing sector. Here the improvement rate shot upward from the beginning of the recovery in 1982 at a rate for both labor and multifactor productivity of a little more than 4 percent/ year. Thus, as is clearly shown in figure 3, the "non-farm, non-manufacturing" sector (which is essentially "services") kept the total economy performance from doing as well as manufacturing. The 1978-90 improvement rate in services was essentially zero.

Figure 1
Private Non-Farm Business Productivity

Source: Bureau of Labor Statistics

Figure 2
Manufacturing Productivity

Source: Bureau of Labor Statistics

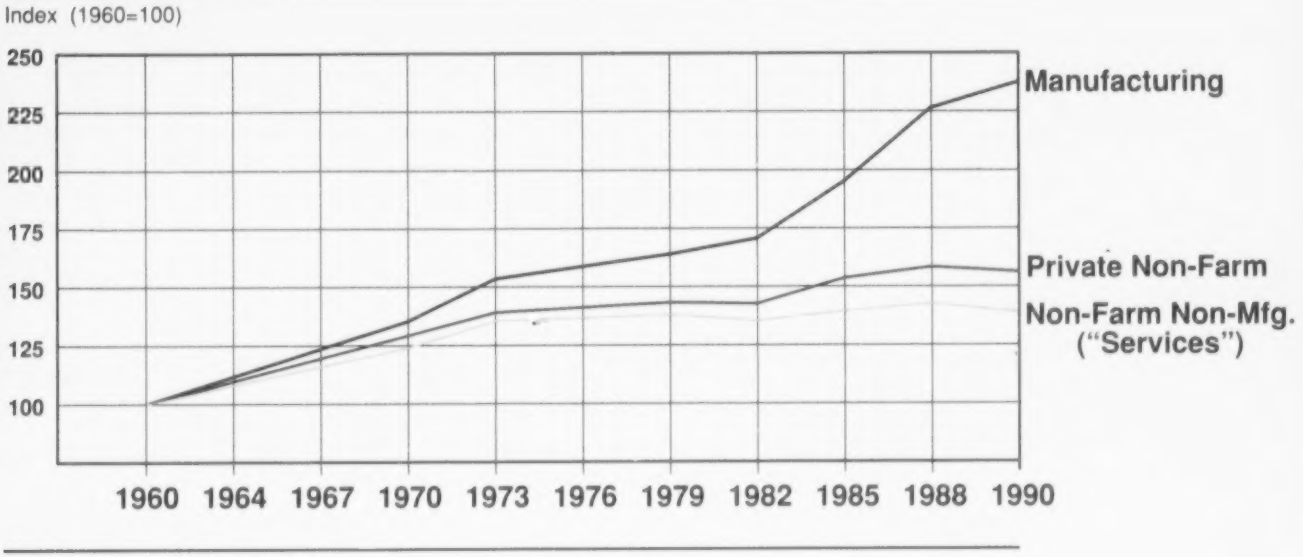
Figure 3a
U.S. Labor Productivity

(Average % per year)	Non-Farm Private Sector	Manufacturing	Est. Non-Farm Non-Manufacturing
1968-1978	1.3	2.6	0.9
1978-1982	(0.4)	1.2	(0.9)
1982-1988	2.0	4.8	1.1
1989	(0.7)	0.9	(1.2)
1990	(0.6)	2.5	(1.6)
1991 (9 months)	0.7	2.0	0.3

Source: Bureau of Labor Statistics, APQC

Figure 3b

Labor Productivity Growth by Sector

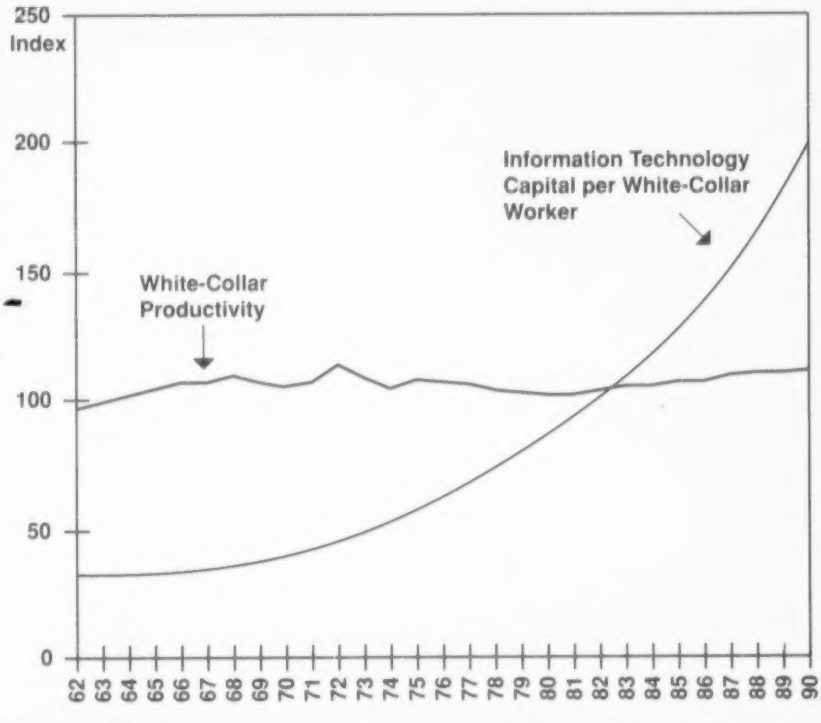


Source: Bureau of Labor Statistics

This is not to say that manufacturing performance was fully satisfactory. Later we will see that other nations did even better. But major explanations of recent poor performance must center on explaining zero services productivity improvement. It is particularly difficult to explain the lack of improvement in services when viewing figure 4, which shows that white-collar workers (about two-thirds of whom are in the service sector) had immensely more information technology capital to work with starting about 1980. The usual explanation is that such information technology capital mainly provides higher quality information (more rapid, more accurate, more complete) that requires on-line interpretation and remedial action in the supported operations. Thus, the manual data manipulation jobs that might be lost through automation are immediately regained in the person of data analysts who can now do something with the better data.

Figure 4

Technology and Productivity in the Service Sector


250
Index
200
150
100
50
0
Information Technology Capital per White-Collar Worker
White-Collar Productivity
62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90

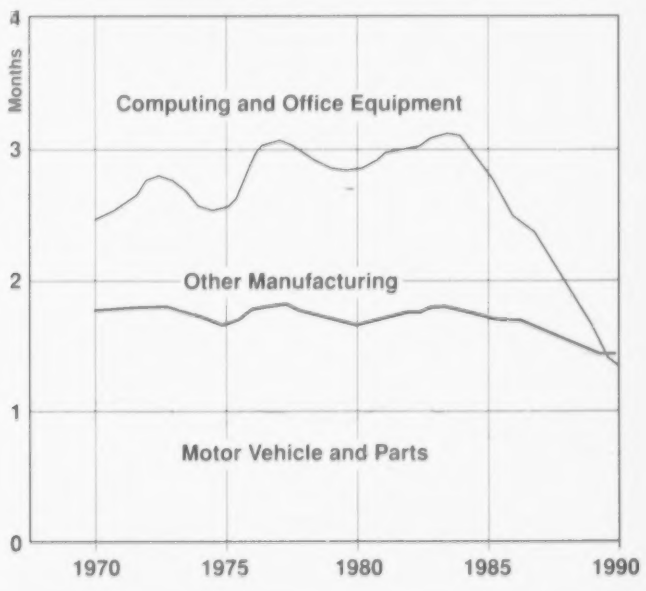
Source: Morgan Stanley

Capital productivity in manufacturing improved right along with labor productivity. Figure 5 shows the persistent decline in relative inventories in manufacturing, which is not at all the case in retail trade. This could to some extent represent competition and/or relative bargaining strength as to who will hold the inventory rather than pure overall reduction. But there should also be some overall reduction in work-in-process inventories with the gradual adoption of just-in-time techniques. The major part of this effect is in computing and office equipment inventories, as is shown in figure 6.

Figure 5
U.S. Stocks-to-Sales Ratios

Source: Department of Commerce

Figure 6
Inventory-Sales Ratio
Selected Manufacturing Industries



Source: Board of Governors of the Federal Reserve System

Figures 7 and 8 present the interrelationship between labor productivity improvement and standard of living, as defined by real compensation per hour growth. The fact is there has been zero real compensation per hour improvement in the last decade, whether the data is from the whole economy or just the manufacturing sector. Fortunately, the growth in nominal compensation per hour has been sufficiently constrained so as to keep the increase in unit labor costs down to 2-3 percent per year for the whole economy and a remarkable slight negative for the period 1983-90 in manufacturing.

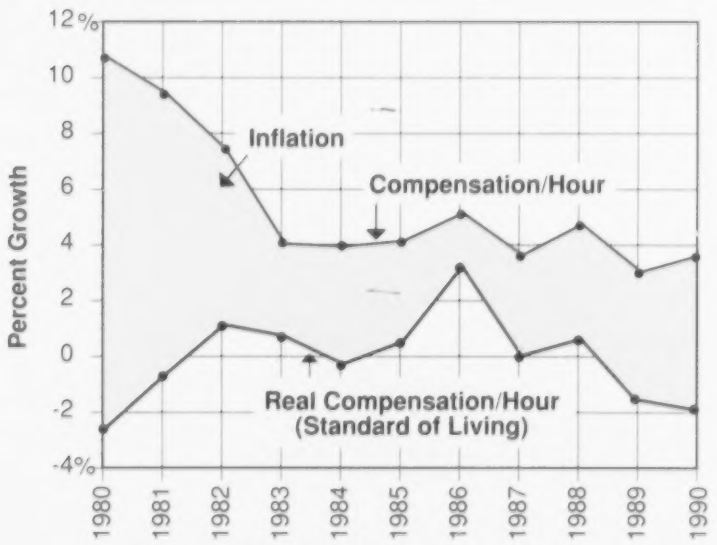
Figure 7

Productivity and Standard of Living (Non-Farm Business)

a. Business View

Source: Bureau of Labor Statistics

b. Worker View

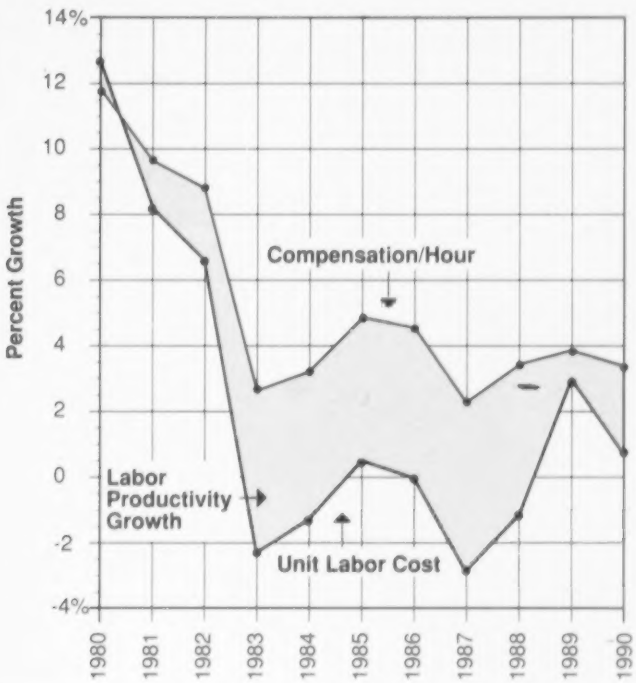


Source: Bureau of Labor Statistics

Figure 8

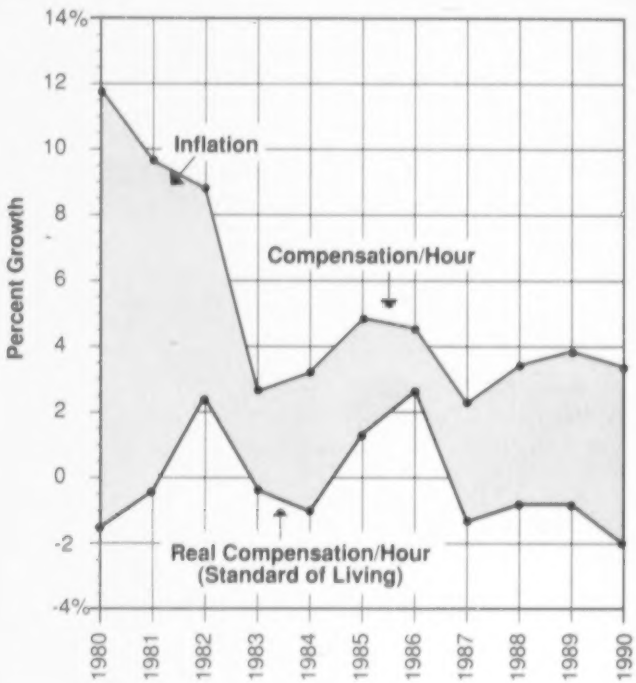
Productivity and Standard of Living (Manufacturing)

a. Business View



Source: Bureau of Labor Statistics

b. Worker View



Source: Bureau of Labor Statistics

If labor productivity growth could increase without relaxing the "lid" on compensation per hour, unit labor cost increases and subsequent inflation would be further reduced and real compensation per hour would rise off the floor once again. Meanwhile, we have had to rely on another trick—having more members of the family work. Figure 9 shows that when real compensation per hour started leveling out, the civilian participation rate started going up rapidly, and the main increase was in the female participation rate. In other words, many families combatted the lack of increase in real income by sending other (predominantly female) members of the family out to work. This is a self-limiting adjustment. The female rate is approaching the male rate, and not much more of this can occur.

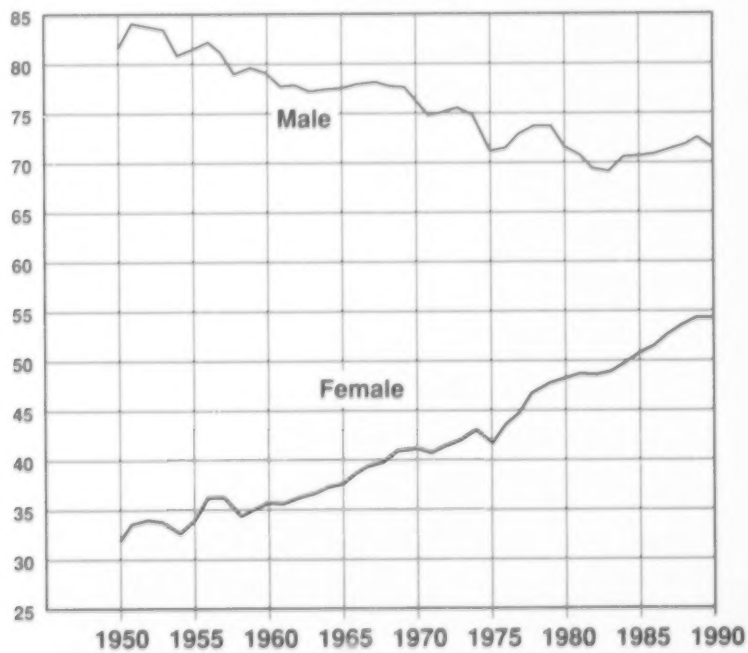
Figure 9a

Participation Rate and Standard of Living

Source: Bureau of Labor Statistics

Figure 9b

Participation Rate by Sex



Source: Bureau of Labor Statistics

Few "pure" quality statistics exist for an economy or industry, but two interesting surveys have demonstrated U.S. problems in quality as compared to Japan. Figure 10a shows that in critical linkages and techniques, Japanese companies are heavier users than U.S. companies, although German companies are even further behind. Figure 10b shows the perception of consumers of different countries of their own and foreign products. Here the U.S. is behind both Japan and Germany.

Figure 10

a. Importance of Quality

Quality Indicator	% of Responding Companies Japan	U.S.	Germany
Customer Satisfaction Important in Strategic Planning Process	95	78	73
Competitor Comparison Important in Strategic Planning Process	92	82	61
Frequent Use of Cycle Time Analysis	84	60	47
More than 25% of Employees on Quality Teams	36	49	20
Frequent Use of Process Simplification	82	47	34

Source: Ernst and Young

b. Quality Perceptions

*Rated by Consumers From:	Products Of: U.S.	Japan	Germany
U.S.	55	46	34
Japan	17	73	32
Germany	26	51	69
Average of Two Foreign Countries	22	49	33

*Percent giving 8, 9 or 10 rating on a 10 point scale

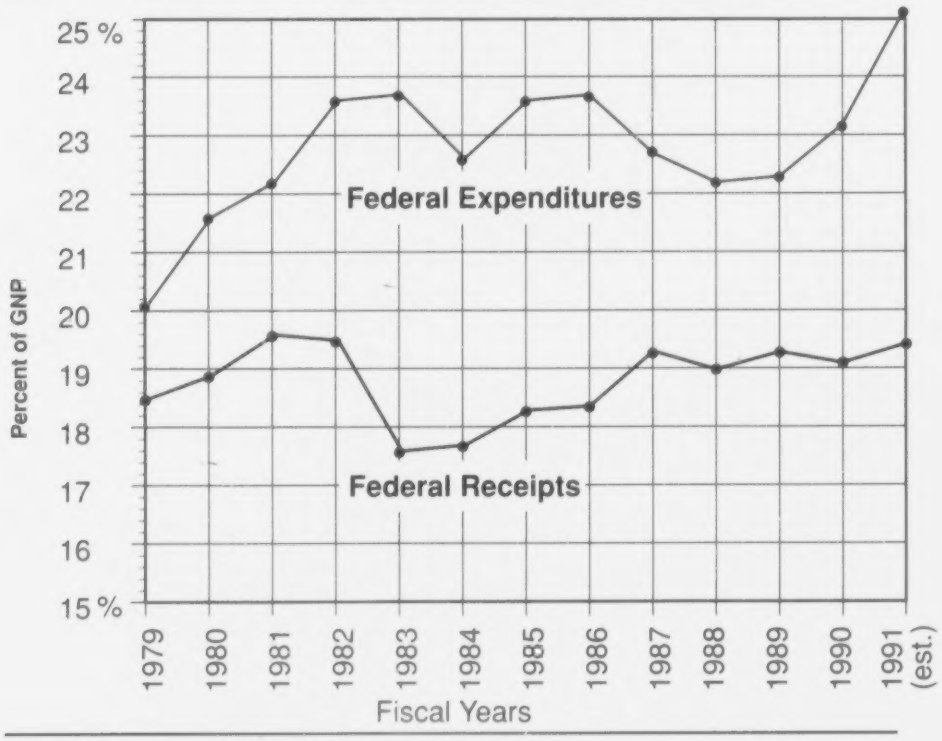
Source: ASQC/Gallup

Interpreting U.S. Performance

"Everything" is the answer to the question: "What impacts and is impacted by productivity?" But a good starting point for understanding the situation of the U.S. is to look at the two key deficits. The overwhelming one is the U.S. Federal Budget deficit shown in figure 11. The improvement through 1989 was encouraging, although more could have been done. If someone had suggested in 1988 that by 1991 the cold war would be over, the resulting forecast of 1991 budget deficit would have been a continuation of the reduction trend approaching balanced books. But something always happens. In this case, a war and criminal irresponsibility by the banking community. Next year it will be something else. This basic budget imbalance takes investment money away from productive use and forces the U.S. to import financial resources through higher than otherwise interest rates and lower than otherwise domestic growth and competitiveness.

Figure 11

Federal Receipts and Expenditures as Percent of GNP



Source: Department of Commerce

The recession of 1990 is clearly seen in figure 12, which shows an abrupt fall in capacity utilization starting in mid-1990. This says there is sufficient capacity available in many industries to increase their business once the ultimate users are able to buy again.

Figure 12

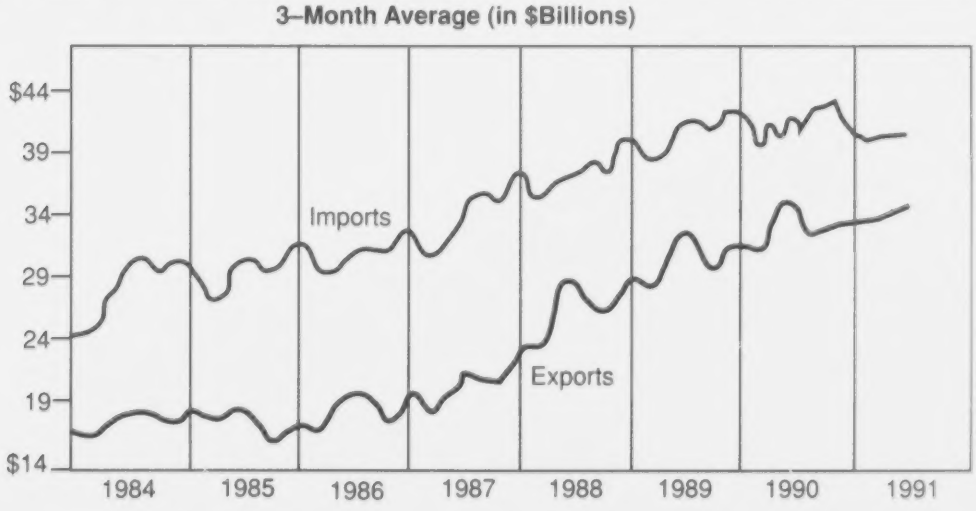
Capacity Utilization, Manufacturing, 1984-1991

Source: Federal Reserve Board

The other deficit of interest is the trade deficit. Here shrinkage is continuing through mid-1991. Figure 13 shows that the main deficit is in consumer goods, petroleum, and autos. Except for the positive balance in capital goods, the positives in materials and food conjure up images of the U.S. as a typical "colony" of the 19th century.

Figure 13a

U.S. Merchandise Trade Deficit



Source: Department of Commerce

Figure 13b

U.S. Merchandise Trade Balance (By Industry)

$ Billion

	1986	1990
Capital Goods (excl. Autos)	+ 7	+ 37
Industrial Supplies/Materials (excl. Petroleum)	- 4	+ 13
Food/Feed	- 1	+ 9
Miscellaneous	+ 6	- 3
Petroleum	- 34	- 52
Autos	- 53	- 50
Consumer Goods	- 64	- 62
Total	-143	-108

Source: Department of Commerce

Figure 14 presents a clear view of the increasing leverage in all of our lives. The value of home mortgages has now reached half of the gross value of all homes, a relative doubling of leverage in 10 years. Real net worth has only grown at less than 2 percent per year in the '80s and has declined in the past year.

Figure 14

Consumer Balance Sheet

$ Trillion

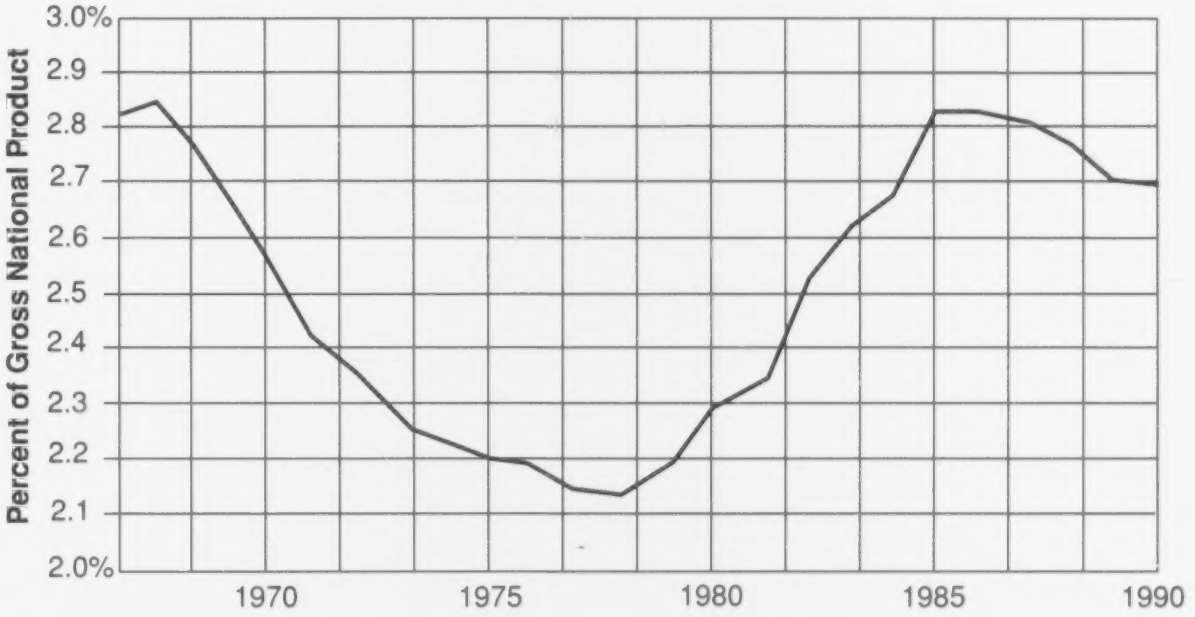
	1960	1970	1980	1990
Assets:				
Financial	1.36	2.49	6.55	14.02
Homes	.47	.82	3.01	5.31
Total	1.83	3.31	9.56	19.33
Liabilities:				
Mortgages	.14	.29	.94	2.66
Other	.09	.20	.55	1.31
Total	.23	.49	1.49	3.97
Net Worth:	1.60	2.82	8.07	15.36
Real Net Worth: (1982 $)	4.45	6.20	8.96	10.86
Overall Debt/Equity Ratio:	.14	.17	.18	.26
Home Debt/ Home Equity Ratio:	.42	.55	.46	1.00

Source: Goldman Sachs

U.S. Research and Development as a percent of GNP has been declining since 1986 (figure 15). It may have declined further in 1991 due to the tendency during a recession to cut "discretionary" research.

Figure 15

U.S. Research and Development, 1966-1990



Source: National Science Foundation

Inflation showed some increases in 1990 over 1989, especially in medical and housing. The war brought increases in energy prices, but this effect should have disappeared in 1991.

Figure 16

Inflation by Sector

(Annual Percent Increase)

	1979-81 Average	1982-84 Average	1985-88 Average	1989	1990
Consumer Price Index, Urban, Total	11.7%	4.9%	3.3%	4.8%	5.4%
Food	9.0	3.4	3.4	5.8	5.8
Housing	13.1	4.7	3.4	3.8	4.5
Transportation	14.7	3.6	1.2	5.0	5.6
Medical	10.3	8.9	6.7	7.7	9.3
Energy	19.2	1.1	(2.8)	5.6	8.3

Source: Department of Labor

International Productivity Performance

The central role of productivity in the development and economic success of a nation is a concept that can easily be deduced by logic or demonstrated by analogy to the activity of small groups, but it is unusual to be able to present the evidence of formal studies. The World Bank has recently published some very interesting study results that give productivity enthusiasts some much needed reinforcement.

Figure 17 shows the relative role of productivity improvement, as opposed to mere increases in input factors of labor and capital, in major industrial economies, and in developing countries by region. The combined statistics of France, Germany, Britain, and the U.S. show that over a 25 year period, total factor productivity increased 1.2 percent. That productivity growth accounted for fully 73 percent of the output growth in those economies. Additional capital accounted for 25 percent of the growth and additional work force only accounted for 2 percent of the output growth. Industrialized economies must concentrate on productivity improvement!

Figure 17

Growth and Importance of Total Factor Productivity

	Annual Growth in TFP	Share of Output Growth From: TFP	Labor	Capital
Four Industrial Economies,* 1960-1985	1.2	73	2	25
Developing Economies, 1973-1987				
East Asia	1.3	20	17	62
South Asia	1.2	24	19	55
Africa	(0.7)	(27)	37	92
Latin America	(1.1)	(48)	51	94

*Average of France, West Germany, United Kingdom and United States

Source: *World Bank* (Boskin & Lau)

The developing countries of East and South Asia showed similar productivity growth in a different measured period (1973-87). This productivity experience accounted for a crucial 20-24 percent of output growth, but the dominant factor for output growth was increased availability of capital. Of course suppliers of capital will be influenced in their decision by the likelihood that it will be productivity used and result in profits to the capital supplier.

In Africa and Latin America, where productivity growth was negative, output growth had to come from both increased capital and increased labor force. The amount of new resources supplied had to be much larger than in other parts of the world per unit of result, because of the resource waste associated with negative productivity growth.

Figure 18 addresses government policy. It presents several "openness" factors of government policy. Each country is analyzed as to which openness factors it practices and which it does not. The complex correlations that fall out show a significant difference between different policy alternatives in the level of productivity growth in that country. Highest productivity growth is associated with low "policy distortion" (as measured by exchange rate premium required or not) and high education level. A high level of investment relative to GNP is also associated with productivity growth. Other variables not shown in the figure that are associated with positive productivity growth are trade liberalization, reduction of bias against agriculture, and higher shares of trade in the nation.

Figure 18

Productivity and Government "Openness"

OPENNESS FACTORS:			Average Annual
Policy Distortion (1)	Education (2)	Investment (3)	Total Factor Productivity Growth
Low	High	—	1.40
Low	Low	—	0.25
High	High	—	0.00
High	Low	—	(0.40)
Low	—	High	0.91
Low	—	Low	0.75
High	—	High	0.07
High	—	Low	(0.36)

Notes:

(1) Foreign Exchange Premium More or Less Than 30%

(2) More or Less Than 3.5 Years of Schooling for 15-64 Years Old Population.

(3) Investment/GDP Above or Below Median

Source: World Bank

Using the more conventional labor productivity statistics, figures 19 and 20 show the U.S. as having the highest level of labor productivity in 1990 among major nations. The U.S. also has the slowest productivity growth of this group. A mechanical calculation, starting from current levels of performance and using these historical improvement rates, results in the U.S. being overtaken by France before the year 2000 and by Italy and Japan before 2005. Of course there is no good reason to assume that the improvement rates will continue the same, but it is the only starting assumption available. The key competition is between industries of different countries, not directly between the countries themselves. But good industry data is not available, and it is generally agreed that the national performance is an important psychological variable. U.S. citizens would not be satisfied with a "perfectly comfortable" third place given a clear, non-political choice in the matter.

Figure 19

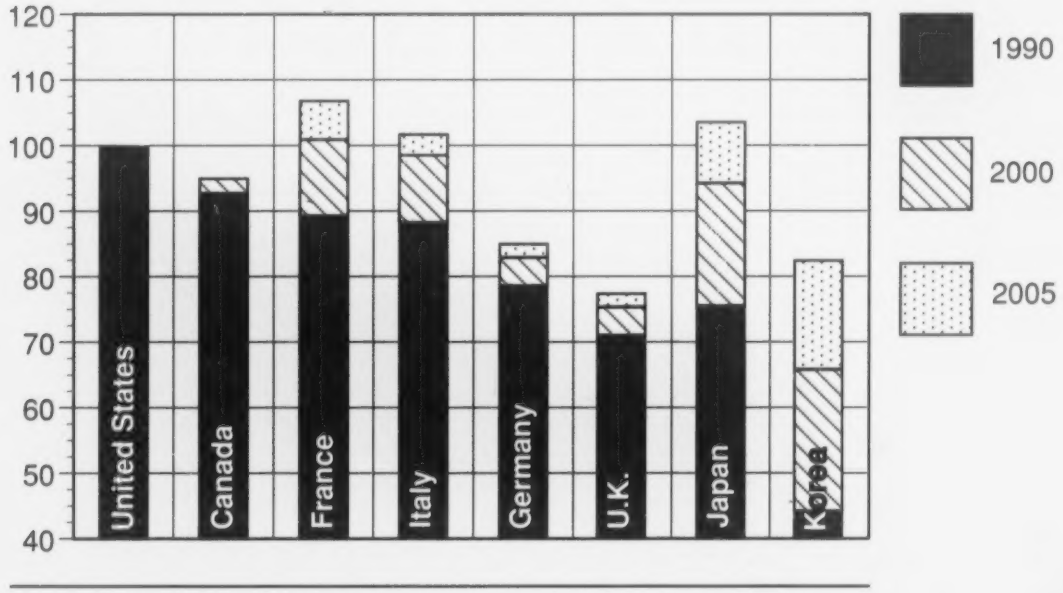
International Labor Productivity
(GDP/Employee, Purchasing Power Parity)

Country	1990 Level (U.S.=100)	Average % Growth 1979-90	Hypothetical Relative Levels* 2000	2005
United States	100.0	0.9	100	100
Canada	93.0	1.0	94	94
France	89.7	2.1	101	107
Italy	88.4	1.9	98	102
Germany	79.1	1.4	83	85
United Kingdom	71.2	1.5	76	78
Japan	76.9	2.9	94	103
Korea	43.3	5.3	66	82

* Using 1979-90 Growth Rates
Source: Bureau of Labor Statistics

Figure 20

International Labor Productivity Levels



Source: Bureau of Labor Statistics

Figure 21 brings in some productivity data from the Asian Productivity Organization on the leading Asian countries. The basis is slightly different. The measure is GDP/employee as in the earlier figures, but the translation is based on market exchange rates rather than purchasing power parity. Japan is the 100 point of the index rather than the U.S. Note that there are four "Tigers" who have all grown at 5-6 percent per year and are between 25 and 50 percent of the level of Japan. Some of the other countries such as Malaysia, Sri Lanka, and Thailand have quite respectable growth rates, but are still further behind Japan.

Figure 21

Labor Productivity Level and Trend, Asian Countries, 1989

	1989 GDP/Employee (Japan=100)		Average Annual Growth in GDP/Employee 1980-1989	
Japan	100		3.2	
Singapore	47		4.8	
Hong Kong	47		4.9	
China (Taiwan)	38		5.3	
Fiji	27		0.8	
Korea	26		6.3	
Sri Lanka	16	(1986)	10.3	(80-86)
Malaysia	13		2.8	
Thailand	5	(1988)	4.2	(80-88)
Philippines	4		(1.0)	
Indonesia	3		1.3	
Pakistan	3		3.8	
India	2		2.9	
Bangladesh	1	(1985)	(2.1)	(80-85)

Note: Based in U.S. Dollar, Market Exchange Rates

Source: Asian Productivity Organization

The manufacturing sector productivity growth rates are higher for most countries but the order is approximately the same, except for the U.S. and U.K. having relatively better performance in 1979-88 and Germany in 1988-90 (figure 22).

Figure 22

International Manufacturing Labor Productivity

(Percent Growth per Year, Output per Hour)

	1988-90	1979-88	1973-79
Japan	4.4	4.0	5.0
United Kingdom	2.8	4.8	1.2
France	2.9	3.3	4.6
Germany	3.8	1.6	4.2
Italy	3.1	4.1	5.7
United States	1.7	3.5	1.4
Canada	1.7	1.3	2.1

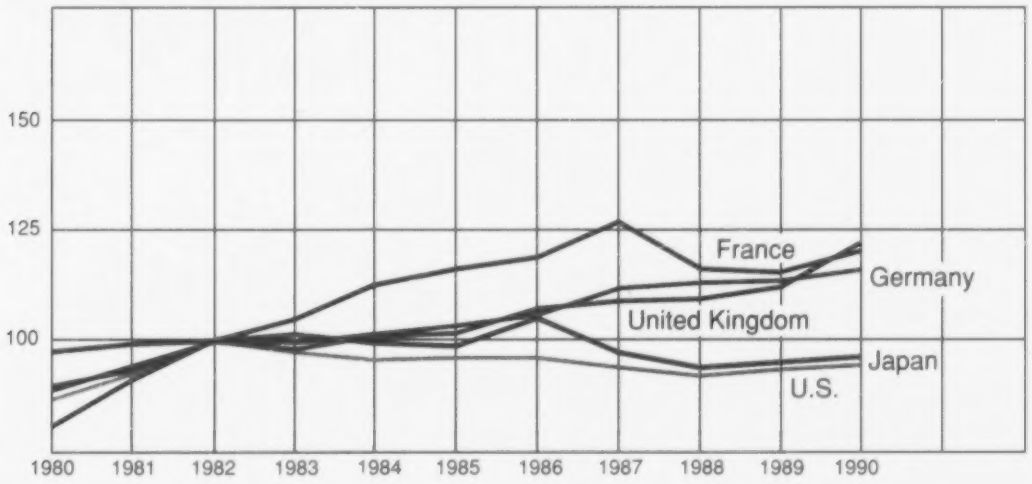
Source: Bureau of Labor Statistics

Figure 23 shows the U.S. has been very successful in wage restraint, thus counteracting in part the long-term disadvantage in labor productivity. The U.S. has done as well as Japan and Germany in holding national currency unit labor costs flat in the last few years. On a dollar basis, the U.S. has the additional advantage of currency weakness for the 1985-87 period to add to its relatively good short-term manufacturing productivity performance then. In that period, even Japan and Germany had increased unit labor costs relative to the dollar.

Figure 23

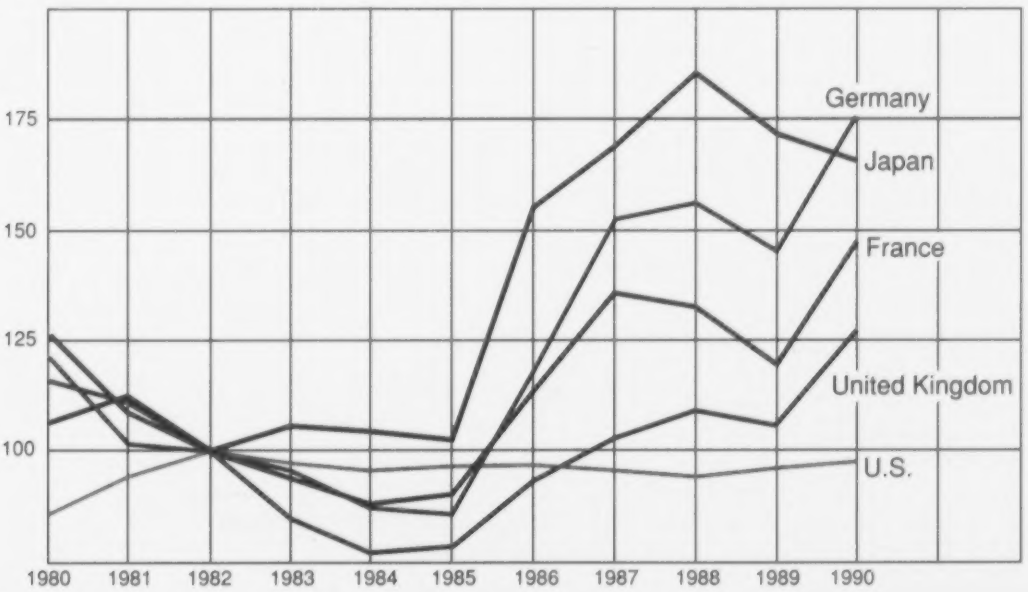
Increase in Unit Labor Cost in Manufacturing

a. National Currency Basis*



*1982=100
Source: U.S. Department of Labor, Bureau of Labor Statistics

b. U.S. Dollar Basis*



*1982=100
Source: U.S. Department of Labor, Bureau of Labor Statistics

Figure 24 shows GNP per capita for the top 50 reporting countries of the world. This is more a measure of standard of living than of productivity but is nevertheless roughly useful. It is based on exchange rate conversion, so the places can shift substantially from year-to-year. Five countries, including Japan, are ahead of the U.S. on this measure. Twelve of the top 18 countries are in Europe. The 50th country has a GNP per capita only about 6 percent that of the leader, but yet there are more countries below the 50th than above.

Figure 24

Level of GNP per Capita for the Top 50 Reporting Countries, 1989

U.S. $000/ Capita	Western Hemisphere	Europe	Pacific Basin	Africa & Near East
21.0+		Switzerland Norway Finland Sweden	Japan	
20.9	United States			
17.3-20.8	Canada	Denmark Germany France Austria		United Arab Emirates
14.3-17.2		Belgium Netherlands Italy United Kingdom	Australia	Kuwait
5.2-14.2		Spain Ireland Greece	New Zealand Singapore Hong Kong	Israel Saudi Arabia Libya Oman
1.4-5.1	Trinidad & Tobago Uruguay Brazil Venezuela Argentina Mexico Costa Rica Chile Panama	Portugal Czechoslovakia Yugoslavia Hungary Bulgaria Poland	Korea Malaysia	Iran Gabon South Africa Algeria Mauritius

Source: World Bank

Figure 25 reports detailed world economic factors: output growth, inflation, and unemployment. A year ago only one nation (Australia) was in a negative GNP growth situation. Now there are six. Even the positives are at least a point lower than a year ago, but Germany, Belgium, and Japan are all better than 1984-87.

Figure 25

World Economic Factors

	Real GNP Growth		Consumer Price Inflation		Unemployment	
	Average % per Year 1984-87	% Last 12 Months*	Average % per Year 1984-87	% Last 12 Months*	Average % per Year 1984-87	% Latest*
Australia	3.9	(2.4)	N/A	3.4	8.3	10.2
Belgium	1.9	3.4	3.6	2.5	11.4	8.7
Canada	4.4	(1.5)	4.2	5.9	10.0	10.2
France	1.8	1.5	4.8	2.6	10.3	9.5
Germany	2.4	4.3	1.2	3.9	6.7	6.4
Italy	3.0	1.4	7.5	6.2	N/A	10.0
Japan	4.0	5.0	1.2	3.3	2.7	2.2
Netherlands	2.3	2.6	1.5	4.4	9.8	4.4
Spain	3.8	2.5	N/A	5.7	20.6	15.0
Sweden	2.6	(1.9)	N/A	8.1	2.6	3.1
Switzerland	2.8	(0.8)	N/A	5.7	0.8	1.3
United Kingdom	3.1	(3.7)	4.6	4.1	11.0	8.5
United States	4.0	(0.9)	3.3	3.8	6.9	6.7

* Last 12 months for GNP is usually 3Q 90 - 2Q 91
Last 12 months for inflation is usually 4Q 90 - 3Q 91
Latest for unemployment is usually September 1991

Source: *The Economist*, Central Intelligence Agency, OECD

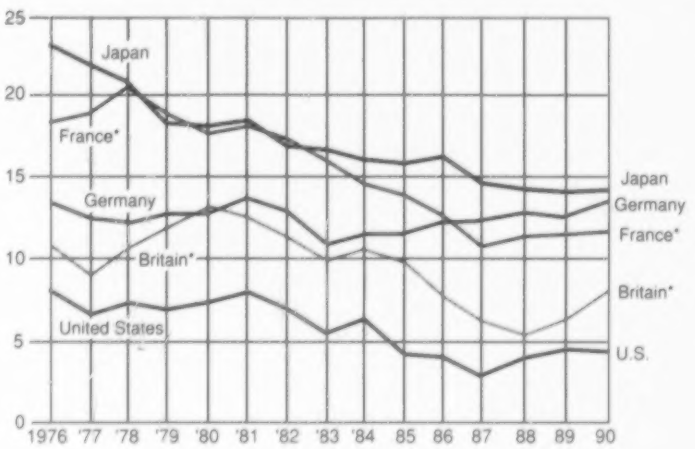
In inflation, everyone is lower than a year ago except Canada, Germany, and the Netherlands. The variation between countries is substantially less than in 1984-87. Perhaps closer integration of economic policies, as symbolized by the European integration, will become the rule.

Most unemployment rates are up from last year, but they are not necessarily ahead of 1984-87.

The household savings rate, shown in figure 26, clearly demonstrates the reason the U.S. has to "import" its financing resources. Even the U.K., which could be counted on to spend as freely as the U.S., has started to increase its savings rate somewhat.

Figure 26

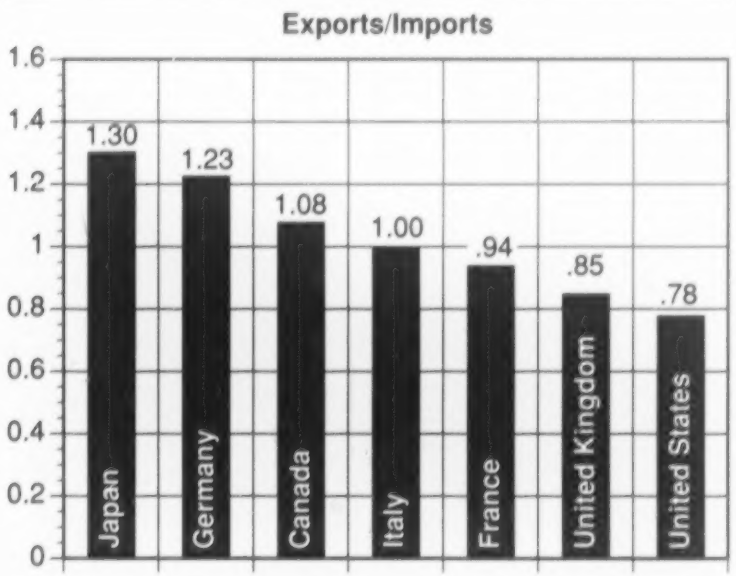
Net Household Savings as % of Disposable Income



*Gross Savings
Source: OECD, Bank of Japan, *The Economist*

Figure 27

International Trade Balances, 1990



Exports	$Billions	Imports
389	United States	498
207	France	220
391	Germany	318
169	Italy	169
182	United Kingdom	214
280	Japan	216
129	Canada	119

Source: Organization for Economic Cooperation and Development

The major differences in trade balance are shown in figure 27. The U.S. has improved from a low ratio of .70 two years ago but is still more imbalanced than any of the others. Japan has fallen from 1.40 last year, but the effect may be temporary.

Figure 28 reports the recent money markets. Nominal interest rates are down everywhere except Germany—as much as three points in the U.S., Canada, and the U.K. But each has a different story. In the U.S., inflation is off, too, so the real rate is similar (and still very low). In Canada, inflation has actually increased a point, so the real rate is down a full five points. In the U.K., inflation is down more than six points, so the real rate is up substantially.

Figure 28

Money Markets, October 1991

	Nominal Interest Rates*	Last 12 Months Inflation	Real Interest Rates
United States	5.3	3.8	1.5
Canada	8.1	5.9	2.2
France	9.2	2.6	6.6
Italy	11.6	6.2	5.4
Germany	9.3	3.9	5.4
United Kingdom	10.4	4.1	6.3
Japan	6.2	3.3	2.9

* 3-Month Money Market
Source: *The Economist*

The major foreign investor in the U.S. is the U.K., followed by Japan and the Netherlands. The U.K. and the Netherlands concentrate on manufacturing and petroleum while Japan is in trade, real estate, and financial services. This total investment is an increase of only 1 percent over last year, although Japan has increased its investment almost 20 percent, largely replacing some U.K. investment (figure 29).

Figure 29

Foreign Direct Investment in U.S., 1990

$ Billions

Industry	Total World	U.K.	Neth.	Other Europe	Japan	Canada	Rest of World
Manufacturing	160	53	24	48	15	9	10
Trade	62	7	6	14	28	2	5
Petroleum	38	15	11	5	0	1	6
Real Estate	35	4	5	2	16	3	5
Insurance	26	7	5	8	1	4	1
Bank/Finance	32	6	4	0	16	4	2
Other	51	15	9	7	7	5	8
Total	404	108	64	84	83	28	37

Source: Department of Commerce

The dollar has strengthened some since late last year, making it somewhat more difficult to use export as a way out of recession and making dollar-based investments slightly more difficult to buy for foreign investors. But the level is still below the level reached in mid-1989, and way below the peaks of 1985 (figure 30).

Figure 30

Trade–Weighted Dollar Exchange Rate*

*Index: March, 1973=100
Source: Federal Reserve Board

A recent study has suggested, with some justification, that unionization is a safeguard against unemployment. Figure 31 shows the relative decrease in unionization in various countries during the '80s against the increase in unemployment from the '70s to the '80s. The correlation is fairly strong. The biggest decreases in unions (Holland and Britain) have the biggest increases in unemployment. The smallest union changes (Canada and Sweden) are among those with small increase in unemployment. But it is a little misleading to measure "points" of unionization change, when some countries are 12 percent unionized and others are more than 40 percent.

Figure 31

Union Density, %

	1980	1988	Decrease (pts.) in Union Density 1980-1988	Increase (pts.) in Unemployment Rate 74-79 to 80-88
United States	23.0	16.4	7	1
Japan	31.1	26.8	4	1
Western Germany	37.0	33.8	3	3
France	19.0	12.0	7	4
Italy	49.3	39.6	9	3
Britain	50.7	41.5	9	6
Canada	35.1	34.6	1	2
Australia	49.0	42.0	7	2
Holland	35.3	25.0	10	5
Sweden	80.0	85.3	(5)	1

Source: *The Economist*

Figure 32 compares auto plants in Japan, Europe, and the U.S., the latter with both U.S. and Japanese ownership. In general, Japanese plants in Japan have the best performance numbers, with Japanese plants in the U.S. close behind. The major exception is that Japanese plants in the U.S. have not yet been able to reduce their stocks very well. The American-owned U.S. plants and Europe are quite similar, except Europe does more training and has fewer job classifications. Europe has almost no one in a team structure, and Europe's productivity is significantly worse.

Figure 32

Auto Assembly Plant Characteristics*

	Japanese in Japan	Japanese in America	Americans in America	European Producers
Productivity (hours per vehicle)	16.8	21.2	25.1	36.2
Assembly defects per 100 vehicles	60	65	82	97
Repair area (% of assembly space)	4.1	4.9	12.9	14.4
Stocks (days)†	0.2	1.6	2.9	2.0
Workforce in a team (%)	69.3	71.3	17.3	0.6
Number of job classifications	12	9	67	15
Training of new workers (hrs.)	380	370	46	173
Absenteeism (%)	5.0	4.8	11.7	12.1
Automation (% of processes automated)				
Welding	86.2	85.0	76.2	76.6
Painting	54.6	40.7	33.6	38.2
Assembly	1.7	1.1	1.2	3.1

*Averages for plants in each region, 1989
†For eight sample parts
Source: *The Economist, MIT, J.D. Power*

Increasing Japanese levels of R&D are highlighted in figure 33. Even the 1978 numbers are high by U.S. standards, and Japan has improved substantially since then in several critical industries.

Figure 33

Japan Research and Development/Gross Sales %

	1978	1983	1989
All Manufacturing	1.82	2.31	3.29
Chemical	2.71	3.34	4.84
Electrical Machinery	3.74	4.70	5.89
Transport Equipment	2.44	2.66	3.40
Precision Machinery	3.15	4.02	5.16

Source: Japan Economic Institute

Figure 34 shows the dramatic changes taking place in the machine tool industry. The U.S. has essentially fallen out of the market, and all of Europe has declined significantly. Their place has been taken by Japan and the rest of the world, including Korea, Taiwan, and other Asian countries.

Figure 34

World Machine Tool Exports

Source (%)	1970	1990
West Germany	31	24
Other West Europe	23	18
Eastern Europe	19	14
United States	12	3
Japan	3	18
Rest of World	12	23
Total Percent	**100**	**100**

Source: *The Economist* (Roland Berger)

Now that benchmarking has become part of everyone's vocabulary, it is worthwhile to do a little benchmarking of the statisticians who put together all the numbers shown in this report. Figure 35 presents the ratings done of each other by these statisticians. The prize goes to Canada for having the best statistics. They have the least revisions, but one reason for this is that they are the slowest to report. The U.S. has few revisions and is more prompt, but the U.S. trails in coverage and reliability, methodology, and integrity/objectivity (i.e., political influences). So here is yet another area for the U.S. to pursue improvement.

Figure 35

World Class Statistics

	Statisticians' Ranking	Revisions* percentage points	Timeliness†
Canada	1	1.0	10
Australia	2	1.7	8
Sweden	3	2.4	5
Holland	4	1.6	9
France	5	1.3	6
Germany	6	3.0	1
United States	7	1.1	4
Japan	8	2.7	7
Britain	9	1.7	1
Italy	10	1.7	1

* Mean absolute deviation between initial estimate of GNP/GDP growth and final figure.
†Average speed of publication of GNP/GDP, industrial production, consumer prices and trade statistics: 1 is fastest, 10 slowest.
Source: *The Economist*

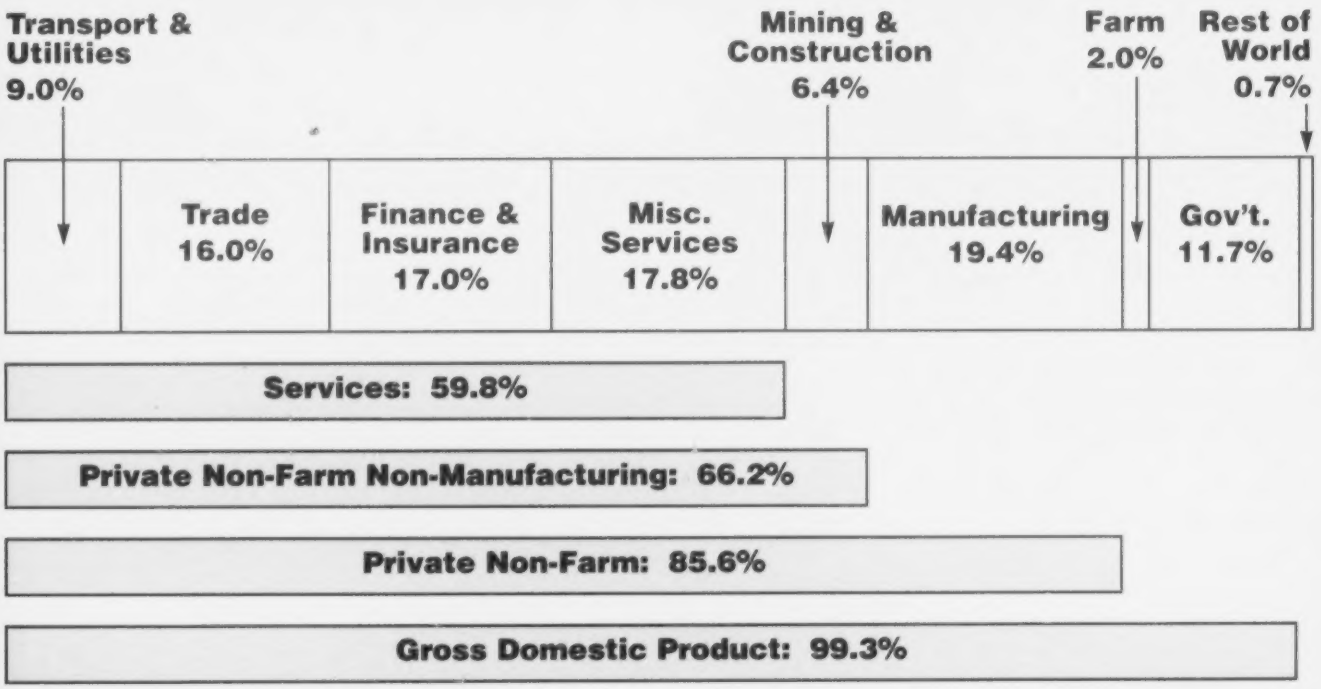
Conclusion

Clearly, the U.S. has a long way to go in productivity and quality improvement. The U.S. manufacturing community has recently made some substantial improvements, which the statistics partly reflect. The major unknown is the service industries: can they start improvement efforts comparable to those of the manufacturers? If not, Japan has a good chance of becoming the world productivity leader in 10 years or less. Even an integrated Europe has a chance of challenging for the leadership in certain aspects of productivity and quality, but many observers are skeptical that politics can be sufficiently defused and that the challenge presented by Eastern Europe's rapid development can be met in time.

The U.S. needs to get beyond the recession and return to budget deficit reduction if it wants to control its fate as a nation in the 21st Century. But the individual householder is busy leveraging up rather than down and the "have it now" attitude is reflected in a Congress that only thinks of budgets as a political issue. The power of productivity and quality as a stimulant of economic development has been amply demonstrated in Asia in recent times, and in the United States in earlier parts of this century. Let's get on with it!

Note: Many different levels of industry and sector management are used in this publication. The relation between the different sectors is shown in the following informational table:

1988 U.S. Gross National Product Breakdown



Glossary of Terms

Business Fixed Investment

Nonvariable business investment in plant, equipment, and other fixed capabilities. Excludes variable investment such as working capital.

Capacity Utilization

A widely used ratio that relates total capacity available to the portion of that capacity actually used during a designated period. For example: passenger seat-miles sold to seat-miles available.

Cash Flow

The net cash proceeds of a productive process; usually includes earnings, depreciation, and other non-cash expenses.

Cycle Time Analysis

Investigation of means to reduce the normal time required to accomplish an activity or process.

Disposable Personal Income

The amount of a family's income available after all taxes have been paid.

Gross Domestic Product (GDP)

Comparable in concept and approach to Gross National Product except that Domestic Product does not include overseas earnings or income of government or private sector entities.

Gross National Product (GNP)

The market value of the final output of goods and services generated by the nation's economy as of a specified time span, including values generated both in the national boundaries and in earnings from overseas. Excludes non-market items such as the efforts of a homemaker. GNP is a value-added concept in that it measures for each input element the net contribution, excluding purchased inputs such as materials, energy and fuels, components, and contract services, thus avoiding double counting.

Input

Inputs, as conventionally applied in productivity measurement, are expressions of the physical amount or the dollar value (cost) of the several elements utilized in production.

Labor Input

A measure of human involvement in production, and the most generally used input measure. May be expressed in terms of number of employees or number of hours worked during the designated period. In rare instances (such as GNP per capita), the "labor" input is simply the headcount of the non-institutional population.

Nominal

As something first appears or is reported; nominal interest rates are rates before considering currency inflation.

Output

At the plant and office level, outputs are often expressed in physical terms—i.e., tons of steel, linear feet of pipe, memos typed, etc. However, outputs are expressed in dollar terms for entities of the "macro economy."

Participation Rate

In this context, the percent of a certain category of eligible people who are employed.

Private Domestic Economy

Similar in approach and concept to GNP and GDP, except that the relevant outputs of government (federal, state, and local), nonprofit entities, and private households are excluded

Productivity

Outputs of goods and services per unit of resources used in a process, ideally measured in physical volumes. May be cited for any level of a productive endeavor from a staff department or individual up to aggregate measures for a production plant, company, industry, or a total economy.

Purchasing Power Parity

A method of comparing dollar aggregates, such as outputs, between different countries. The domestic costs of a common set of commodities and services in each country and their national currency inflation rates are the building blocks. Better for longer term economic analysis than translation using volatile market exchange rates.

Quality

Meeting or exceeding the requirements of a customer regarding a product or service; in a broader context, includes effective operation of processes required to create and deliver those products and services.

R & D

Research and development; expenses made to advance new products, services, or processes with benefits to be received partly in future time periods.

Real

With effects of inflation removed; constant dollars. The opposite is "nominal" or "reported."

Standard of Living

A measure of quality of life across countries and regions. Common specific measures used are real GNP per capita and real compensation per hour.

Total Factor Productivity

A measure of the relationship between the output of a process and all of the inputs to that process. Conventionally, these inputs are classified as labor, capital, materials, energy, and purchased business services.

Unit Labor Cost

The net increase in cost of a unit of labor for a business or agency. It is usually calculated from nominal compensation per hour growth less improvement (if any) in labor productivity during the same time period. The implication is that wage growth is costless to a business if labor productivity is improving just as rapidly.

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